

ratepayers may have made to the cost of that loop when it was merely unused spare capacity. AT&T/WorldCom Ex. 11P (Murray Reb.) 32; *accord*, Tr. 2996 (Tardiff). Hence, charging current ratepayers for spare capacity that is expected to go into future revenue-generating service produces double-recovery of costs, and requires current ratepayers to cover costs they did not cause. AT&T/WCOM Ex. 20 (Murray Surreb.) at 38-41.

Alfred Kahn, a perennial witness for the ILECs, has explained why this outcome is neither fair nor efficient:

We have already posed the question of the proper rate [of depreciation] when a plant is built far in advance of total need—perhaps because there are great economies of scale. To charge depreciation in equal annual installments would be to impose a disproportionately heavy burden on customers in earlier years, when much of the capacity lies idle. Considerations of fairness—the idle capacity is really for the benefit of future, not present customers—and economic efficiency present a case for something similar to SRMC pricing, which would have the effect of concentrating the capital charges in later years.”

1 A. Kahn, *The Economics of Regulation* 121 (1970) (AT&T Ex. 100).

b. Copper Distribution Cable In The Synthesis Model

As noted in the AT&T/WCOM Initial Cost Brief, the target fill factors in Mr. Pitkin’s runs of the Synthesis Model for distribution cable are 50-75%, and the effective fill factor (averaged across density zones) is 52.5%. Those are the same values adopted by the Commission as forward-looking in its USF proceeding. AT&T/WCOM Cost Br. at 151.⁴⁵

⁴⁵ Verizon contends that the effective fill factors resulting from line counts and capacity of the same vintage would be 64.3% today and exhaust by 2004-05. Verizon Cost Br. at 160. Verizon’s assertions are incorrect. The only correct way to measure fill factors is total available lines constructed by the model to total current lines. Mr. Pitkin’s testimony correctly identifies this ratio as 52.5%. Verizon is attempting to manipulate Mr. Pitkin’s analysis by comparing total available lines to future line counts (year-end 2002). This analysis is patently incorrect and is unsupported by any testimony in this proceeding.

This amount of spare capacity is ample to provide for years of growth in demand, as the Commission has recognized. AT&T/WCOM Cost Br. 151-52. Cf. *Universal Service Tenth Order* ¶ 201 (“Significantly, we note that, contrary to GTE’s inference, current demand as we define it includes an amount of excess capacity to accommodate short-term growth.”); *id.* ¶ 203 (rejecting Bell Atlantic’s claim that fill factors should be lower because there was no evidence that such fill factors were insufficient to meet current demand plus some growth).

The effect of these utilization inputs is to overstate greatly the price of distribution plant, because the Synthesis Model develops the unit cost of capacity by dividing all projected demand for mid-year 2002, not the mid-point in the projected life of the plant constructed in the Synthesis Model. *Id.* at 151-52.

c. Copper Distribution In Verizon’s Model

Verizon also understates the distribution fill that should be used in its own models. Verizon bases its copper distribution fill factor on the fill levels it claims are currently experienced in its embedded network. Verizon asserts that this level is **[BEGIN VERIZON PROPRIETARY]** **[END VERIZON PROPRIETARY]**. This is undoubtedly not Verizon’s actual fill, but even if it were, that fill factor would be entirely inappropriate as a basis of assessing cost. The Virginia SCC found in the 1997 UNE case that a utilization factor of 50 percent was sufficient, and AT&T/WCOM witness Joseph Riolo, an experienced outside plant engineer, found that effective utilization ratios in parts of Verizon’s plant were even higher. AT&T/WCOM Cost Br. at 151.

In defense of its proposed utilization ratio, which requires the purchaser of a loop to pay for nearly **[BEGIN VERIZON PROPRIETARY]** **[END VERIZON PROPRIETARY]** loops worth of capacity, Verizon offers little more than the *ipse dixit* that this level is necessary, efficient, and consistent with the engineering standard of two pairs per household.

Verizon Cost Br. at 110-12. Verizon, unable to offer any optimization analysis to support this ratio, insists that the burden of proof with respect to this issue falls on AT&T/WorldCom. *Id.* at 111. The *Local Competition Order* makes clear, however, that the burden of demonstrating the reasonable level of capacity utilization falls on the ILEC, not its CLEC customers. *Local Competition Order* ¶¶ 680, 682. *See also* Massachusetts Section 271 Order ¶ 39 (questioning whether 40% fill factor in Massachusetts was appropriate without state-specific justification by Verizon).

In any event, the standard of two pairs per household is no longer forward-looking or efficient, particularly in light of the availability of wireless, DSL and cable modem services that can substitute for a second line. **[BEGIN VERIZON PROPRIETARY]**

[END VERIZON PROPRIETARY] Verizon makes no mention of these guidelines, let alone offer a reason why they are any less appropriate in the former Bell Atlantic territory in Virginia than in the former GTE territory.

Moreover, the fill factor proposed by Verizon for copper distribution increases substantially if one adjusts for the substantial number of defective pairs in Verizon's network—a number that would be far lower in a reconstructed network. AT&T/WCOM Cost Br. at 154. Indeed, when the various factors set forth above are considered, the distribution fill factor of 60% proposed by AT&T/WorldCom in adjusting Verizon's studies is conservative—even if it

were appropriate to build substantial spare capacity for future growth into the models and charge present customers for that capacity. Id.

Further reducing Verizon's proposed utilization factor for copper distribution to credit current ratepayers for the present value of future revenue from expected demand, as required by sound economic theory, would result in an effective economic fill factor of 90 percent or more. AT&T/WCOM Cost Br. at 156. Verizon's fill factor is therefore far too low, and even the fill factor used by AT&T/WorldCom in their restatement is extremely conservative because it provides substantial spare capacity for growth.

d. Copper Feeder Utilization In The Synthesis Model

The AT&T/WCOM Cost Brief demonstrated that the target fill factors of the Synthesis Model for copper feeder cable yield effective fills that provide ample capacity for growth in demand, and easily satisfy Verizon's own engineering guidelines. AT&T/WCOM Cost Br. at 157-58. Verizon offers no response to this analysis beyond the bald assertion that the proposed factor would be unreasonably low. Verizon Cost Br. at 160.

e. Copper Feeder Utilization In Verizon's Model

AT&T/WorldCom also showed in their initial brief that Verizon's own models also understate utilization for copper feeder. The utilization rate assumed by Verizon is below the actual utilization in Verizon's embedded network, and even further below the utilization permitted in a reconstructed network, with fewer defective pairs. The *economic* utilization rate, after properly crediting current ratepayers for the present value of future revenue from growth in demand, would be even higher. AT&T/WCOM Cost Br. 159-60. Verizon's brief does not discuss copper feeder utilization at all.

f. Fiber Feeder Utilization In The Synthesis Model

The Synthesis Model uses a target fill factor of 100% for fiber strand. The Commission adopted this fill factor in its Model because fiber inherently contains spare that can be used for maintenance. Any growth in demand can be accommodated by changing the electronics on the end of the fiber without the need to add new fiber. *Universal Service Tenth Order* ¶ 208; Tr. 4497 (Riolo). Verizon's arguments for a lower utilization rate (Verizon Cost Br. at 112) are without merit. *See* AT&T/WCOM Cost Br. at 160.

g. Fiber Feeder Utilization In Verizon's Model

Verizon significantly understates the utilization for fiber feeder even within the constraints of its own models. Verizon states that utilization of fiber feeder is only [BEGIN VERIZON PROPRIETARY] [END VERIZON PROPRIETARY] in its own network and that Verizon uses this percentage in its models. Verizon explains that the fiber feeder utilization is low because the 12-fiber ribbon structure requires the provisioning of excess strands. Verizon Cost Br. at 112.

In a forward-looking network, however, all "excess" fibers from use of 12-fiber ribbons would be used to provide other services. Verizon's assumption that insufficient demand would leave much of this spare capacity to provide other services is contradicted by the record. AT&T/WCOM Cost Br. at 161. Moreover, GTE's Infrastructure Provisioning Guidelines state that BEGIN VERIZON PROPRIETARY

END VERIZON PROPRIETARY. Under Verizon's theory, fills at this level are impossible.

h. RT Plug-In Utilization

The AT&T/WorldCom Cost Brief explains why the Synthesis Model input for RT plug-in utilization, RT common equipment utilization, and copper feeder utilization is reason-

able, and the proposed plug-in utilization rate in Verizon's model is too low. AT&T/WCOM Cost Br. at 162-63. Verizon's cost brief does not address with this issue.

i. RT Common Electronics Utilization

AT&T/WorldCom's initial brief explains why the Synthesis Model target fill factor of 70% to 82.5%, depending on density zone, is conservative, and the utilization rate assumed by Verizon for its own model, 56%, is too low. AT&T/WCOM Cost Br. at 163-65. Verizon's cost brief does not address with this issue.

j. Conduit Utilization

Conduit utilization is not an issue in the Synthesis Model. Within the Verizon models, however, Verizon substantially understates conduit utilization, for the reasons explained by AT&T/WorldCom. AT&T/WCOM Cost Br. at 166-67. Verizon's comments on this issue (Verizon Cost Br. at 113-14) are answered in AT&T/WCOM's cost brief at pages 166-67.

10. Loop Electronics For DS-1 And DS-3 Services

Verizon contends that the Synthesis Model fails to account for the electronics and fiber required to provision DS-1 and DS-3 services. Verizon Cost Br. at 144. Verizon is wrong. The costs developed by the Synthesis Model for DS-0 equivalents include the DS-0 line cards on the DLC which more than offset the electronics required to provision DS-1 and DS-3 services when the relevant multiplier is applied to generate costs for high-capacity loops. AT&T/WCOM Cost Br. at 167; AT&T/WCOM Ex. 14P (Pitkin Surreb.) at 49. Indeed, the ratio that AT&T/WorldCom "used to estimate the cost of a DS-1 includes over four times the line card costs of a POTS line." *Id.* Additionally, the fiber required to provide DS-1 and DS-3 services is relatively inexpensive; and, in all events, that fiber costs less than the copper that the Synthesis Model builds. AT&T/WCOM Cost Br. at 167.

11. 4-Wire Loops

Verizon incorrectly states that, in calculating the costs of 4-wire loops, AT&T/WorldCom failed to account for the required plug-in-slots and channel units. *See* Verizon Cost Br. at 144. As AT&T/WorldCom have previously shown, they evaluated the cost of the additional technology required for 4-wire loops, and concluded that a 4-wire loop costs 1.7 times more than a 2-wire loop. AT&T/WCOM Cost Br. at 167; AT&T/WCOM Ex. 1 (Pitkin Dir.) at 24. The capacity limitations of the common control assembly which drives common equipment costs simply do not, as Verizon contends, depend upon the space occupied by plug-ins. AT&T/WCOM Cost Br. at 168. AT&T/WorldCom reasonably assumed that a DLC channel unit costs twice as much for a 4-wire loop than a 2-wire loop and factored that assumption in calculating the ratio between costs for 2-wire and 4-wire loops. *Id.*

12. Cost Of Support Structure

a. Structure Mix

The Synthesis Model's mix of support structure – buried, underground, and aerial – should be adopted by the Commission because it represents the appropriate mix of outside plant that would be expected in a forward-looking network. AT&T/WCOM Cost Br. at 168-173. Remarkably, one of Verizon's criticisms is that the dominant structure type in the Synthesis Model is buried cable, rather than "underground facilities [which] are the most expensive to install." Verizon Cost Br. at 159. However, that is exactly the point – a forward-looking network would be constructed in the least-cost, most efficient manner. When outside plant engineers determine that it is more efficient and cost-effective to bury cable, rather than use underground structure, then such a structure mix should be reflected in a TELRIC-compliant cost model. Verizon's assertion that the "MSM arbitrarily assumes a plant mix that could not be

achieved in Virginia” simply disregards the evidence and highlights Verizon’s bias for recovering embedded costs. *Id.* at 158.

The evidence presented by AT&T/WorldCom shows that the mix of support structure used in the Synthesis Model is fully justified. The Synthesis Model assumes a higher percentage of buried cable than that reflected in Verizon’s model because of the increasing trend of using buried cable in new subdivisions. AT&T/WCOM Cost Br. at 176. AT&T/WorldCom also explained that the Synthesis Model assigns a lower percentage of underground cable than that in Verizon’s model because, *inter alia*, underground cable is not often used outside dense, urban areas due to the high costs and hazardous conditions associated with its installation. AT&T/WCOM Ex. 18P (Riolo Surreb.) at 16; AT&T/WCOM Ex. 6 (Riolo Dir.) at 40-42; AT&T/WCOM Cost Br. at 171-172. Notably, Verizon’s model cavalierly ignores that Verizon’s own engineering guidelines strongly discourage the use of underground structure. AT&T/WCOM Cost Br. at 172.

Verizon demonstrates its disregard for this evidence in asserting that the Synthesis Model assumes an outside mix that is purely arbitrary. Verizon Cost Br. at 158. Verizon makes clear that its disagreement with the outside plant structure mix in the Synthesis Model rests – once again – on the notion that its embedded outside plant mix (purportedly extrapolated from the results of its engineering survey) is an appropriate and reasonable proxy for the structure mix that would be expected in a forward-looking network.⁴⁶ Verizon’s criticism of the structure mix proposed by AT&T/WorldCom is without merit.

⁴⁶ See, e.g., Verizon Cost Br. at 83 (noting that its “existing structure is the best estimate of what *any* wireline carrier today, or at any point in the future, would build to serve demand in the Virginia network”) (emphasis in original).

As AT&T/WorldCom demonstrated in their cost brief, the design of the engineering survey on which Verizon heavily relies is so seriously flawed that the reported results could not possibly reflect accurate information regarding Verizon's embedded structure mix. That survey—performed between 1993 and 1995—is totally useless. As designed, the survey calls for pure guess work as to what structure would be used for whatever cable Verizon happened to have in the planning pipeline on some unknown day years ago. AT&T/WCOM Cost Br. 49-51, 169-170. Furthermore, the survey results are untrustworthy because the survey default identified buried structure as the predominant structure whenever the respondent failed to specify a structure type. *Id.* at 170.

Although Verizon insists that its engineering survey accurately reflects its embedded outside structure mix, the current record is bereft of any evidence that would somehow corroborate the accuracy of the information in Verizon's survey results. In this regard, in defending the purported reliability of its survey results, Verizon argued that the survey results were not based exclusively on the memories of the respondents, but rather also reflected the respondents' examination of "various detailed records such as plats (which show the switching size and location of each cable), feeder route schematics, outside plant maps, and other documents containing detailed information about Verizon's outside plant facilities." Verizon Ex. 122 (Verizon Cost Panel Surreb.) at 60. *See also* Tr. 4027 (Gansert).

However, at the hearing, AT&T/WorldCom pointed out that Verizon failed to produce any documentation (other than the survey instructions) in response to their discovery request seeking the production of detailed backup documentation for Verizon's 1993-1995 engineering survey. Tr. 4028-4034; AT&T Ex. 112 (AT&T/WCOM Discovery Request 1-34); *accord*, AT&T/WCOM Ex. 12P (Recurring Cost Panel Reb.) at 16. In arguing that AT&T/WorldCom were precluded from raising this issue because they failed to file a motion to

compel, Verizon left the clear impression that responsive documents existed, but AT&T/WorldCom were at fault for taking Verizon's nonproduction as an admission that the documents did not exist (Tr. 4031-4032, 4034):

Ms. Ronis: I'm going to object to this line of questioning. I mean its clear Mr. Levy has one interpretation of the interrogatory, and never moved to compel on this. I think he's suggesting we should have shipped truckloads of documents with all our plats and records. It's clear in the answer we didn't produce that. I don't know where this line is going, other than to get into a disagreement about what interrogatory does or does not ask for.

* * * *

Ms. Ronis: I don't think he's established that the document didn't exist. We will go pull the interrogatory Mr. Sanford refers to, but we interpreted the interrogatory one way not to ask for 9,000 UAA cable plats, and we believe that's the reasonable interpretation. I want to correct the record.

In a response discovery response in Pennsylvania, however, Verizon recently admitted that the detailed documentation underlying its engineering study *does not exist after all*.⁴⁷

The survey was conducted in the 1993-95 timeframe, the original records and source materials of maps, plats, network diagrams and the like that the engineers used in the survey no longer exists. Attached in the file named: MCOM_ATT_V-17_Svyinst93.doc are the survey instructions.

Because, by Verizon's own admission, the documents underlying its engineering survey no longer exist, it is impossible for the Commission and the parties to assess the extent to which Verizon's engineering survey results reflect inaccurate information regarding its actual

⁴⁷ Response of Verizon Pennsylvania Inc to Set V, Interrogatory No. 17 of MCI WorldCom Communications, Inc. and AT&T Communications of Pennsylvania, Inc. dated January 10, 2002, *Generic Investigation of Verizon Pennsylvania Inc.'s Unbundled Elements Rates*, Docket No. R-00016683, Pennsylvania Public Utilities Commission.

embedded outside plant structure mix. What is clear, however, is that the very design of the survey -- that invited the respondents to engage in rank speculation regarding the so-called predominant structure in each UAA and used buried structure as a default value -- necessarily spawned inaccurate information regarding Verizon's actual embedded structure mix (as of 1993-95). For this reason alone, the survey results cannot be relied upon as accurate evidence of Verizon's embedded outside plant structure mix. Moreover, Verizon has provided no empirical evidence demonstrating that the mix of structures has remained unchanged since the 1993-1995 period.

In all events, Verizon's criticism that AT&T/WorldCom's proposed structure mix fails to take into account the types of structure in place in Verizon's network simply reflects its position that its embedded network should serve as the lodestar of all cost modeling. AT&T/WCOM Cost Br. at 50-51. However, for purposes of TELRIC, the forward-looking mix of an efficient network -- not the actual mix of the embedded network -- is the proper standard. The AT&T/WorldCom model mix satisfies that test. AT&T/WCOM Cost Br. at 168-173.

b. Structure Sharing

Under TELRIC principles, because the concept of "long run" refers to a time in which all costs are avoidable, artificially high costs incurred by Verizon as a result of its failure to exploit available structure sharing opportunities will be avoided. As AT&T/WorldCom have demonstrated, Verizon's cost study does not properly account for the structure-sharing opportunities that would be available to an efficiently-operated company in a forward-looking environment. The evidence shows that, on a forward-looking basis, the percentages of shared structure will dramatically increase as carriers and utilities seek to share more facilities on structures to save costs and an efficient carrier's incentives to engage in structural sharing increase. *See, e.g.*, AT&T/WCOM Cost Br. at 173-181. AT&T/WorldCom have shown that, in a forward-looking

network in which the entrant would take full advantage of structure-sharing opportunities to reduce costs, there would be, *inter alia*: two-way sharing of the underground trench; three way sharing of buried structure; and a 40% reduction in feeder structure investment attributable to sharing between feeder and distribution structures. *Id.*

Moreover, the evidence refutes Verizon's argument that buried and underground structure sharing would be rare and impossible to coordinate in the forward-looking environment. *See Verizon Cost Br.* at 155-156. The Commission has already rejected the notion that the need for coordination in a TELRIC, scorched node environment would render buried and underground structure sharing arrangements impossible. *Universal Service Tenth Order* at ¶244 n. 504. Because of the high costs of underground structure, the lost productivity time and hazardous conditions associated with underground work, the continuing efforts of municipalities to minimize street openings, and the efforts of CATV carriers and utilities to serve new customers and upgrade their networks, the sharing of the underground trench in a forward-looking environment will significantly increase. *AT&T/WCOM Cost Br.* at 175-178.

Similarly, the opportunities for buried structure-sharing arrangements in the forward-looking environment should increase as well. In the long run, carriers and utilities will have greater incentive to cooperate in the sharing of buried facilities because of, *inter alia*, the cost savings that will be achieved by such coordination. Moreover, the evidence presented by AT&T/WorldCom -- which Verizon does not dispute -- showed that even today, local exchange carriers pay no charge at all for many buried structures because builders of subdivisions are willing to place power, telephone, and CATV cables in trenches at no charge. *AT&T/WCOM Ex. 12P (AT&T/WorldCom Rebuttal Cost Panel Reb.)* at 76-77. For all of these reasons, the structure sharing percentages in the Synthesis Model are reasonable and should be adopted.

Verizon's criticism of the sharing assumptions proposed by AT&T/WorldCom as "wholly unrealistic" is misplaced because – as its repeated references to its current practices make clear – Verizon defines "realism" in terms of its embedded network. Verizon Cost Br. at 156. In attempting to bolster its argument that AT&T/WorldCom's proposed structure sharing percentages are unrealistic, Verizon claims that: (1) at the hearing, AT&T/WorldCom witness, Ms. Murray, concurred with Verizon's view that sharing opportunities in the forward-looking network will mirror those available in Verizon's embedded network; (2) structure-sharing opportunities in the forward-looking network will be limited to those occasions on which plant is installed in new developments where utility companies have not previously installed facilities; and (3) the Commission should accept Verizon's word that any structure sharing reflected in its cost study demonstrates that Verizon has fully exploited and will continue to exploit structure-sharing opportunities in the forward-looking environment. *Id.* at 101-102, 156. Verizon is wrong on all counts.

Verizon has grossly distorted Ms. Murray's testimony. Placing special emphasis on the word "actually," Verizon states that Ms. Murray conceded that "the only relevant analysis is the determination of 'the manner in which structure-sharing opportunities will *actually* be available to companies such as Verizon.'" *Id.* at 101. Verizon contends further that Ms. Murray's testimony confirms that Verizon's proposed cable and structure investments are appropriate and reasonable since "they already reflect the limited structure sharing that Verizon VA has been able to achieve to date." *Id.* However, Verizon has quoted selectively from and glaringly omitted critical portions of Ms. Murray's testimony.

In response to the Staff's inquiry regarding the manner in which structure sharing percentages should be determined, Ms. Murray testified that the calculation of structure sharing opportunities "should be based on a *forward-looking view* of the manner in which structure

sharing opportunities *will actually be* available. . . .” Tr. 3217 (Murray) (emphasis added). Thus, Ms. Murray did not testify, as Verizon suggests, that Verizon’s *embedded* structure sharing percentages should mirror that the amount of structure sharing that would exist in a forward-looking environment, but rather stated that structure sharing calculations should be based on a “*forward looking view*” of the structure sharing opportunities that would be available in a forward-looking network. Indeed, Ms. Murray expressly stated that the determination of structure sharing opportunities in a forward-looking environment should *not* “be based on a look of what sharing exists on the embedded plant as a snapshot.” Tr. 3218 (Murray). Thus, Ms. Murray explicitly rejected the notion that Verizon’s embedded structure percentages properly reflect the amount of structure sharing that would be expected in a forward-looking network.

Additionally, Verizon’s argument that structure sharing opportunities in the forward-looking environment will be limited strictly to those instances in which plant is placed in new developments “where the utilities do not already have facilities” is wrong. Verizon Cost Br. at 102. Power companies will continue to rebuild and/or replace facilities to accommodate growth in demand and to upgrade obsolete facilities. Furthermore, CATV companies are upgrading their networks to 2-way interactive design systems; and other data service providers are upgrading their networks to fiber. *See, e.g.,* AT&T/WCOM Cost Br. at 174-175. Accordingly, despite Verizon’s misguided assumptions to the contrary, structure-sharing opportunities in a forward-looking network will not be limited only to those “circumstances where the utilities do not already have facilities.” Verizon Cost Br. at 102. Other structure-sharing opportunities in the forward-looking network will be available as power companies, CATV companies and all other providers of data services continue to upgrade their networks and service new customers.

Furthermore, the Commission should reject Verizon’s invitation to assume that any embedded structure sharing reflected in its cost study properly reflects that it has taken full

advantage of and will continue to take full advantage of structure-sharing opportunities. In embellishing this allegation, Verizon states that “[c]ertainly sharing which reduces costs is something that Verizon VA would always have had an incentive to pursue if such opportunities in fact existed.” Verizon Cost Br. at 156. Verizon’s analysis is flawed.

As a preliminary matter, the design of Verizon’s model renders it impossible for the parties and this Commission to determine the actual structure sharing percentages that are reflected in Verizon’s cost study. AT&T/WCOM Cost Br. at 175-176. Thus, neither the Commission nor the parties can assess, on the basis of this record, the extent to which Verizon has pursued structure-sharing opportunities. Further, although Verizon claims that it has exploited and will continue to exploit all structure sharing opportunities that reduce costs, Verizon’s statement is belied by its own proposal to *reduce* opportunities for structure sharing by placing the majority of its feeder underground, while placing its distribution cable *in the same route* in aerial structure. *Id.* at 180. Since Verizon proposes to place the *majority* of its feeder underground -- while placing its distribution cable in the same route in aerial structure -- the only reasonable conclusion that can be drawn is that Verizon for its own reasons has embarked on a course of action that can only yield increased and unnecessary costs.

c. Issues Regarding Conduit, Poles And Drop

In their initial brief, AT&T/WorldCom demonstrated that, in relying on an historical average of its purported installed conduit costs in Virginia between 1996 and 2000, Verizon blithely ignored that the average installed costs of conduit have declined as the amount of conduit has increased. AT&T/WCOM Cost Br. at 181-182. Because the amount of conduit that will be installed in the forward-looking network will exceed the length of conduit that Verizon installs in a given year, AT&T/WorldCom have shown that it is entirely reasonable to use the cost of conduit with the greatest length of conduit installed in a year, which was in 1998.

Verizon contends that exogenous factors, wholly unrelated to the amount of conduit installed, could have contributed to the variability in its conduit costs. Verizon Cost Br. at 97-98. However, as AT&T and WorldCom have demonstrated, Verizon has proffered no empirical evidence confirming that its declining conduit costs are attributable to any factor other than the length of conduit installed. AT&T/WCOM Cost Br. at 182. As a consequence, Verizon's blanket, wholly unsupported assertions regarding *possible* reasons for the variability in its conduit costs are nothing more than idle speculation. Notably, although Verizon possesses all the data that explains the underlying reasons for its conduit costs in a given year, it has elected not to proffer such empirical data and analysis to the Commission and the parties. Because the current record lacks any verifiable evidence showing that Verizon's declining conduit costs are due to anything other than the length of installed conduit, Verizon's attempt to justify its overstated cable investments based upon wholly unsupported allegations should be rejected.

With respect to pole investment, Verizon contends that its actual historical experience in installing poles in Virginia between 1996 and 2000 provides a sound basis for pole costs in a forward-looking environment. *See* Verizon Cost Br. at 99. Rejecting AT&T's and WorldCom's argument that pole installations in the forward-looking environment would realize the efficiencies attributable to sequential installation and minimization of mobilization and demobilization, Verizon contends that costs would increase if poles were installed at one time. *Id.* However, even Verizon concedes that the costs of planned installations are lower than the costs of emergency installations. *Id.* Clearly, a forward-looking entrant constructing a new network would have costs similar to those associated with planned installations, rather than the higher costs associated with emergency or very small installations.⁴⁸

⁴⁸ Verizon claims that the Synthesis Model generates an unacceptably low drop length of 27 feet. Verizon Cost Br. at 153. However, as AT&T and WorldCom demonstrated in their opening

G. Switching Costs

1. Verizon's Switching Cost Study Arguments Ignore The TELRIC Standard And Are Undercut By Its Own Evidence.

In the Verizon Switch Cost Brief, Verizon argues for its "growth only" switch discount standard that is fundamentally inconsistent with TELRIC and ignores its own evidence in this and other proceedings on the TELRIC issues and on the appropriate ratio of traffic sensitive costs. Its arguments on the right-to-use factor, port utilization, and feature additive costs all seek to raise switching costs inappropriately, and its attacks on the Synthesis Model for failure to account for peak traffic and relying on outdated technology are misplaced.

a. Verizon's "Growth" Discount Fails To Comply With TELRIC.

Verizon's Switch Cost Brief seeks to justify Verizon's use of the "growth only" discount as being consistent with TELRIC. This is futile. As demonstrated in AT&T/WorldCom's opening briefs, Verizon well understands the TELRIC requirements relating to switching, and Verizon's statements make clear that TELRIC requires the use of new or replacement switch discounts in determining switching investment. *See* AT&T/WCOM Cost Br. at 17-21; AT&T/WCOM Switch Cost Br. at 5-7; AT&T/WCOM Ex. 11 (Murray Reb.) at 7-10 (quoting Verizon witness statements acknowledging that TELRIC requires use of new switches in modeling network). Those new or replacement switches represent "the most efficient technology" that is at the core of TELRIC's requirements. Local Competition Order, ¶ 685. Verizon knows what TELRIC requires.

brief, Verizon's calculation is incorrect. AT&T/WCOM Cost Br. at 184-185. If Verizon had performed its calculations properly, it would have derived a drop length of 77 feet.

Indeed, Verizon's arguments merely reflect its embedded cost mindset. Verizon argues that it makes "no economic sense" to replace the entire network with new switches (Verizon Switch Cost Br. at 8), but that argument is correct only if one assumes, as TELRIC does not, that Verizon's embedded network is fixed. Moreover, in its outside plant model, Verizon made the same network replacement assumption that it claims makes "no economic sense." AT&T/WCOM Ex. 15P (Baranowski Surreb.) at 10-11. As demonstrated in the AT&T/WCOM Switch Cost Brief, Verizon is seeking to increase its switching investment by relying on the lower growth-only discount that reflects its embedded costs and short-run perspective rather than TELRIC's long-run requirements where no inputs (or embedded costs) are fixed. AT&T/WCOM Switch Cost Br. at 13-15.⁴⁹

Verizon's contention (Verizon Switch Cost Br. at 6-10) that this Commission has rejected the new switch discount standard is wrong.⁵⁰ Indeed, the Commission itself developed the methodology adopted in the Synthesis Model that incorporates the new switch discount derived in the FCC's switch price study. That methodology includes, as Verizon concedes in its brief, *id.* at 7, the switch discount (largely based on new switch prices) that Verizon claims the Commis-

⁴⁹ Verizon's claim that a new entrant could not purchase all new switches at the existing new switch discount because the demand for new switches would force up switch prices is an economic red herring. Verizon Switch Cost Br. at 10-11. This is a cost modeling exercise, not actual network construction, and the existing prices represent the costs a new entrant would face for purposes of determining Verizon's costs. See AT&T/WCOM Cost Br. at 23-24. Thus, Verizon's Bridgestone tire example has no relevance to this proceeding.

⁵⁰ There is also no basis for Verizon's claim (*id.* at 26-27) that the Commission's methodology does not accurately model switching costs. The comment cited by Verizon merely states that switching costs were "less significant" than loop costs in the USF context and would have greater significance in a UNE cost model. *Universal Service Fifth Order*, ¶ 75. The Commission never stated that the switching cost module was less accurate than other portions of the Synthesis Model, and, in fact, the Commission's discussion of the switching module in both the *Universal Service Fifth Order* and *Universal Service Tenth Order* totally belies any such claim. *Universal Service Fifth Order*, ¶¶ 75-80; *Universal Service Tenth Order*, ¶¶ 286-337.

sion has rejected. Moreover, the court of appeals and FCC decisions cited by Verizon (*id.* at 8 nn. 9 & 10) do not reject the new switch discount, but rather refuse to overturn (generally on deferential review standards) the determination made by a state commission in the context of a Section 271 application.⁵¹

b. Verizon's Growth Proposal Reflects Its Embedded Costs And Should Be Rejected.

Verizon claims that its alleged "life cycle" discount calculation provides an "extremely generous discount." (Verizon Switch Cost Br. at 5-6). This is fantasy and reflects Verizon's backward looking orientation. First, this study is, by definition, a short-run cost study that fails to take account of forward-looking costs. Second, as Verizon concedes, its study covers only 1996-2000, and as a result excludes the period during which Verizon purchased half of its digital switches. Verizon Ex. 213. Thus, half the new switch purchases are excluded, even though most (if not all) the growth/upgrades associated with those excluded new switches are included in Verizon's calculations. Third, any claim that the level of growth discounts is "generous" because the "end of the life cycle" for digital switching ignores the lower costs of the new packet switching technology. Such lower costs should result in lower, not higher, forward-looking costs for switch functionality. AT&T/WCOM Ex. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 103-04. Fourth, the study makes adjustments relating to "getting started" costs that are inconsistent with cost causation principles discussed *infra*. Given these and other problems, this study is not reliable.

⁵¹ Some of the state commission decisions cited by Verizon demonstrate a lack of appreciation of TELRIC's requirements and the need for leadership by this Commission in this proceeding in setting forth the appropriate TELRIC requirements in this area.

Verizon also asserts incorrectly that the use of the new switch discount understates Verizon's forward-looking costs by failing to take into account future growth. Verizon Switch Cost Br. at 10. As Ms. Murray demonstrated, however, the new switch discount sets the maximum price on a net present value basis that Verizon would have to pay over the life of the switch. AT&T/WCOM Ex. 11 (Murray Reb.) at 35 n.46.⁵²

In contrast to Verizon's embedded cost approach, as set forth in the AT&T/WorldCom Switch Cost Brief, a new switch with its associated new switch discount combined with the calculation of the net present value of the line growth and the discount rate offers an approach that takes into account the switch's "life cycle" costs. AT&T/WorldCom Switch Cost Br. at 7-10. As Ms. Murray testified, this use of the line growth net present value and discount rate focuses on line growth in the switch's early years -- the discounted value of any costs in the out years is likely to be small because the discount rate is higher than the line growth net present value during that period. Tr. 5422-23 (Murray). Given this approach and the early-year focus on switch line growth, the FCC's Synthesis Model approach of using switch price information from the first three years of switch operation serves as useful proxy for this net present value calculation as it includes the new switch discount and any growth/upgrades (and associated growth/upgrade switch discounts) during the switch's first three years. Indeed, Verizon witnesses testified that Verizon switches generally have their first growth/upgrade addition during the first 2-3 years of the switch's operation, Tr. 5266 (Gansert), and that initial

⁵² Verizon is equally misguided in claiming that maintenance costs of new switches would be the same as the maintenance costs of older equipment. Verizon Switch Cost Br. at 10 n.15. The lower maintenance costs have nothing to do with the higher new switch discount and everything to do with the self-evident fact that new equipment is less costly to maintain than older equipment.

grown/upgrade would be included in the depreciation data used in the Synthesis Model calculations.

AT&T/WorldCom believe that the FCC's methodology calculates the appropriate discount for switches and takes into account any line growth in the switch.⁵³

2. Verizon Significantly Understates The Ratio Of Traffic Sensitive To Non-Traffic Sensitive Costs.

AT&T/WorldCom and Verizon agree that cost causation should govern the allocation of traffic sensitive and non-traffic costs. At bottom, Verizon's cost causation principle is that an increase in calls by definition must increase costs, and it has allocated its costs accordingly. Verizon Switch Cost Br. at 16-21. This standard is certainly easy to apply, but is contradicted by Verizon's own evidence and testimony demonstrating on cost causative grounds that most switching costs are not traffic sensitive.

Verizon claims that "usage is by far the largest cost driver of additional switch capacity." Verizon Switch Cost Br. at 20. This is simply not the case. As Verizon's own SCIS model determined, Verizon's average switch processor utilization over the life of the switch is [BEGIN VERIZON PROPRIETARY]

[END VERIZON PROPRIETARY] AT&T/WCOM Ex. 12P

(AT&T/WorldCom Recurring Cost Panel Rebuttal) at 112 & Att. 4; Tr. 5171 (Pitts).⁵⁴ These

⁵³ At the request of the Commission Staff, AT&T/WorldCom also discussed an approach relating to use of the SCIS model to develop a "melded" discount. If the SCIS model were to be used in making any calculations regarding the melding of new and growth discounts, then it would be important to run the SCIS model twice to ensure that components of the switch that are always purchased at a new switch discount (e.g., the getting started cost) receive the appropriate new switch discount treatment and that those components of the switch that "grow" would receive a melded discount. Tr. 5416-18 (Murray).

⁵⁴ The SCIS model inputs by Verizon demonstrate that Verizon believes that the switches will be replaced prior to processor exhaust. For all Verizon switches, the estimated years to processor exhaust is [BEGIN VERIZON PROPRIETARY] [END VERIZON

very low percentages reflect the large switch capacity built into modern digital switches (AT&T/WCOM Ex. 4 (Pitts Dir.) at 7-8) and explain why usage can increase three- or four-fold without exhausting the switch. Tr. 5447, 5455-56 (Pitts). Thus, the cost of the incremental call (even by the “heavy user” posited by Verizon (Verizon Switch Cost Br. at 19)) will not result in extra processor costs for Verizon. Verizon witness Gansert in essence confirmed this point in his testimony conceding that the switch is designed so that the processor does not exhaust. Tr. 5449-50, 5457-58 (Gansert).

A very small percentage of the overall investment in current digital switch technology is engineered based on peak period usage.⁵⁵ As Ms. Murray explained in her testimony, peak usage (and hence peak period-driven capacity needs) will vary from switch to switch, depending on the characteristics of the customer base (e.g., residential vs. business customers) served by the switch.

Verizon also claims that the “getting started” costs are traffic sensitive, citing statements by Verizon witness David Garfield, a Telcordia representative. Verizon Switch Cost Br. at 19. In fact, Mr. Garfield in his written testimony concedes that the “getting started” costs do not vary with volume: “SCIS determines a ‘getting started’ investment for each switching system. This investment models the investment for processor-related equipment and other *equipment independent of switch size (i.e., lines and trunks) and traffic.*” Verizon Ex. 123 (Garfield Surreb.) at 6 (emphasis added). Mr. Garfield’s SCIS model documentation similarly states that the “getting

PROPRIETARY] while the number of years to switch replacement is **[BEGIN VERIZON PROPRIETARY]** **[END VERIZON PROPRIETARY]**. If it were truly the case that Verizon’s switches exhausted their processors prior to switch replacement, why doesn’t Verizon reflect that fact in its SCIS inputs?

⁵⁵ The percentage of Verizon’s total switch investment that is peak period related can be found in the Restated Workpapers Subsection 5.9 EO Material Inv. (elec. Workpapers AT&T Va- Part C-8-1 Switch MOU Supp (1) xls.

started” costs are fixed: **[BEGIN VERIZON PROPRIETARY]**

[END VERIZON PROPRIETARY] Even Verizon admits that “[g]etting started costs represent the investments associated with the switch processor and memory, and are considered fixed costs and do not vary with additional traffic offered to a switch.” AT&T/WCOM Ex. 16 (Pitts Surreb.) at 9 (citing Verizon response to AT&T Data Request 11-39 in Maryland Docket No. 8879).⁵⁶ In light of these Verizon admissions and the plain statement in the SCIS documentation that “getting starting” costs are not traffic-sensitive, Verizon’s claim to the contrary is untenable.

Given Verizon’s own evidence indicating that switch costs are largely non-traffic-sensitive, Verizon seeks to portrays changes to AT&T/WorldCom’s traffic-sensitive ratio as some wild exercise consisting of “unsupported” and “constant revaluations.” Verizon Switch Cost Br. at 20. This is ridiculous. Ms. Pitts’s direct testimony proposed a 60% non-traffic-sensitive percentage based on publicly available data and indicated that she would analyze Verizon’s costs once she received the necessary data. AT&T/WCOM Ex. 4 (Pitts Dir.) at 8. She also suggested that the 60% non-traffic-sensitive percentage would be used in the initial run of the Synthesis Model. *Id.* As it turned out, this did not happen, and the Synthesis Model used the default value of 30% non-traffic-sensitive. The AT&T/WorldCom Recurring Cost Panel

⁵⁶ Verizon also excluded “getting started” costs from its modeling of reciprocal compensation costs. It claimed that it included only the incremental costs of additional traffic associated with terminating other carriers’ traffic and that reciprocal compensation traffic does not cause a burden to processing capacity. It also admitted, however, that the switch processing of UNE traffic and reciprocal compensation was exactly the same. AT&T/WCOM Ex. 12P (AT&T/WorldCom Recurring Cost Panel Reb.) at 122-24.

testimony specifically acknowledged the error, AT&T/WCOM 12P (AT&T/WorldCom Recurring Cost Panel Rebuttal) at 116 n.103, and provided the promised restatement of Verizon's switching costs with the non-traffic-sensitive percentage of 84% for use in the restatement, and supporting calculations.⁵⁷ *Id.* Att. 5. As Ms. Pitts has noted, the definition of non-traffic-sensitive costs differs in Verizon's SCIS model and in the Synthesis Model, and Ms. Pitts in her surrebuttal testimony performed the calculations and provided the non-traffic-sensitive cost percentage of 77% (again with supporting calculations) for use in the Synthesis Model. AT&T/WCOM Ex. 16 (Pitts Surreb.) at 7 n.17 & Proprietary Ex.1; Tr. 5538-39 (Pitts) (explaining that rebuttal testimony related to Verizon cost model and included restatement of traffic sensitive ratio for use in restated Verizon model and that surrebuttal testimony related to Synthesis Model and included testimony setting forth appropriate traffic sensitive ratio for inclusion in Synthesis Model). In short, Verizon's efforts to make an issue of the timing of this evidence are fruitless.

Verizon's last argument is the shameless claim that AT&T/WorldCom are trying to shift costs from higher-use business customers to lower-usage residential customers. Verizon Switch Cost Br. at 23. In fact, AT&T/WorldCom are seeking to actually *use* cost causative principles rather than just mouthing them as Verizon does. Verizon profits by having inflated minute-of-use charges that allow it to overrecover its switch costs and to deter competitive entry by CLECs. Moreover, inflated minute-of-use charges send the wrong economic signals to users about the

⁵⁷ This traffic-sensitive-cost percentage varies depending on the Verizon data in each state. For example, the corresponding traffic sensitive cost percentage is [BEGIN VERIZON PROPRIETARY] [END VERIZON PROPRIETARY]. Verizon's claim that no other state has a low traffic-sensitive cost percentage is wrong. Verizon Switch Cost Br. at 20. Illinois has a flat rated switch cost structure, making its traffic sensitive cost percentage zero.

incremental cost of telephone calls. AT&T/WCOM Ex. 8 (Murray Dir.) at 13-16. As Ms Murray summarized the issue:

Verizon is viewing the recovery of getting-started costs, including processor costs, which is not expected to exhaust over the life of the switch, as a cost allocation issue, in the sense they're treating it as a shared cost and saying, "Well, because this was designed to benefit people by making calls, the reasonable way to recover this shared fixed cost is to allocate it over calls."

As an economist, I'm very uncomfortable with the price signal that is being sent by doing that. If it is not likely, and we don't expect the processor to be the limiting factor, [and] if these getting-started costs are fixed costs, then the reason that we have proposed treating them as per-line costs is to avoid sending the signal that usage on the margin has a variable costs, and that deterring customers when their incremental usage has zero marginal cost from making additional calls which will benefit everyone and, ironically, reduce the average cost per call of these getting-started costs.

So, if you want to talk about what a good way of recovering what the parties appear to agree is a cost that will be fixed and will not change with calls, that is our . . . cost-causation rationale because additional calls are not causing the cost.

Tr. 5459-61 (Murray). Clearly, Verizon prefers the present arrangement, but AT&T/WorldCom's recommended ratio of traffic sensitive costs should be adopted, with the Commission choosing between the alternative rate designs proposed by AT&T and WorldCom.⁵⁸

⁵⁸ Contrary to Verizon's suggestion (Verizon Switch Cost Br. at 17 n.23), AT&T and WorldCom are each pursuing the alternative switch rate designs that they have proposed to the Commission in this proceeding. WorldCom's reply brief on switch rate design issues is attached to this reply brief as Attachment 1.